

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII**

In The Matter Of The Application Of

**HAWAIIAN ELECTRIC COMPANY, INC.
HAWAII ELECTRIC LIGHT COMPANY, INC.
MAUI ELECTRIC COMPANY, LIMITED**

**For Approval of a CHP Program, Schedule CHP -
Customer-Sited Utility-Owned Cogeneration
Service, Inclusion of Related Fuel Costs in the
Energy Cost Adjustment Clause, and a
Modification to the Energy Cost Adjustment Clause
and Schedule Q.**

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DOCKET NO.

**PUBLIC UTILITIES
COMMISSION**

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APPLICATION

AND

CERTIFICATE OF SERVICE

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OF THE STATE OF HAWAII**

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**HAWAIIAN ELECTRIC COMPANY, INC.
HAWAII ELECTRIC LIGHT COMPANY, INC.
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**For Approval of a CHP Program, Schedule CHP -
Customer-Sited Utility-Owned Cogeneration
Service, Inclusion of Related Fuel Costs in the
Energy Cost Adjustment Clause, and a
Modification to the Energy Cost Adjustment
Clause, Avoided Energy Cost Filing and Schedule
Q.**

APPLICATION

**TO THE HONORABLE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII:**

HAWAIIAN ELECTRIC COMPANY, INC. ("HECO"), HAWAII ELECTRIC LIGHT COMPANY, INC. ("HELCO") and MAUI ELECTRIC COMPANY, LIMITED ("MECO"), collectively referred to as the "Companies" or "Applicants", respectfully request that the Commission 1) approve each Company's CHP (Combined Heat and Power) Program and initial 5-year budget of capital expenditures for the program ("5-year program budget"), subject to the flexibility provisions included in Section IV.3 of this Application, 2) approve each Company's proposed Schedule CHP, Customer-Sited Utility-Owned Cogeneration Service ("Schedule CHP"), and the proposed standard form

Combined Heat and Power Agreement (“CHP Agreement”) and Eligibility Criteria, included therein, 3) approve the inclusion of the fuel and transportation costs, and related revenue taxes, incurred under the CHP Agreements filed pursuant to the CHP Program and Schedule CHP, in each Company’s respective Energy Cost Adjustment Clause to the extent that the costs are not recovered in each Company’s base rates, 4) approve a modification to each Company’s respective Energy Cost Adjustment Clause, avoided energy cost filing, and Schedule Q to allow the inclusion of the fuel and transportation costs, and related revenue taxes, incurred under the CHP Agreements filed pursuant to the CHP Program and Schedule CHP, 5) approve an exemption from the requirements of paragraph 2.3(g)(2) of General Order No. 7 (“G.O. 7”) for CHP system capital expenditures projects done pursuant to each Company’s Schedule CHP, and 6) grant the Companies such other and further relief as may be just and equitable in the premises.

I

HECO, whose principal place of business and whose executive offices are located at 900 Richards Street, Honolulu, Hawaii, is a corporation duly organized under the laws of the Kingdom of Hawaii on or about October 13, 1891, and is now existing under and by virtue of the laws of the State of Hawaii. HECO is an operating public utility engaged in the production, purchase, transmission, distribution, and sale of electricity on the island of Oahu.

HELCO, whose principal place of business and whose executive offices are located at 1200 Kilauea Avenue, Hilo, Hawaii, is a corporation duly organized under the

laws of the Republic of Hawaii on or about December 5, 1894, and is now existing under and by virtue of the laws of the State of Hawaii. HELCO is an operating public utility engaged in the production, purchase, transmission, distribution, and sale of electricity on the island of Hawaii.

MECO, whose principal place of business and whose executive offices are located at 210 Kamehameha Avenue, Kahului, Hawaii, is a corporation duly organized under the laws of the Territory of Hawaii on or about April 28, 1921, and is now existing under and by virtue of the laws of the State of Hawaii. MECO is an operating public utility engaged in the production, purchase, transmission, distribution, and sale of electricity on the islands of Maui, Lanai and Molokai.

II

Correspondence and communications in regard to this application should be addressed to:

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III

1. By this Application, the Companies respectfully request approval for their respective CHP Program and Schedule CHP, pursuant to which they propose to offer combined heat and power systems (“CHP systems”) to eligible utility customers as a regulated utility service. The proposed CHP Program is intended to facilitate the implementation of utility CHP systems to meet the needs of qualifying customers in a way that benefits all of the Companies’ respective customers. It is also designed to complement the State’s objectives to reduce dependency on imported fuel oil through greater efficiency of use and to pursue more environmentally friendly means of meeting the State’s growing energy needs. The CHP Program is discussed in further detail in Part IV.

2. CHP systems are a form of distributed generation (“DG”) that utilize waste heat from the power generation process as energy (heat or steam) for heating or cooling purposes. DG refers to the use of small-scale generating units located at or near the load to produce electricity. DG technologies include more conventional reciprocating engines and combustion turbines, renewable technologies such as wind and photovoltaic systems, and developing technologies such as fuel cells and micro-turbines.

3. The proposed Schedule CHP is the tariff provision that would be applicable to customers participating in the CHP Program. Under Schedule CHP, the Companies would own, operate and maintain customer-sited, packaged CHP systems (and certain ancillary equipment used to convert waste heat to chilled or heated water) pursuant to a

standard form agreement with the customer. Customers taking service under Schedule CHP will be required to execute a standard form CHP Agreement, setting forth the customer's rate schedule discount, thermal charge, facilities charge, if applicable, and other terms and conditions set forth in Schedule CHP. The individual CHP Agreement, along with a CHP system notice transmittal, then will be filed with the Commission in accordance with the file and suspend provisions of Section 269-16(b) of the Hawaii Revised Statutes ("HRS"), and will be kept open for public inspection (except that the thermal charge and customer information deemed to be confidential and proprietary will be deleted and filed pursuant to a Protective Order issued by the Commission). This will provide an opportunity for the Commission and Consumer Advocate to review individual CHP Agreements (and the confidential and proprietary information, which would be filed under Protective Order), before the individual CHP Agreements become effective. Schedule CHP, and the "file and suspend" provisions, are discussed in further detail in Part V.

IV

CHP PROGRAM

1. **Scope of Program**

The CHP Program was analyzed using a 20-year planning horizon¹, although the Companies are seeking authorization only for each Company's initial 5-year program

¹ The 20-year planning horizon corresponds with the planning horizon for integrated resource planning ("IRP"). See Commission's Framework for Integrated Resource Planning (revised May 22, 1992) ("IRP Framework"), which was issued pursuant to Decision and Order No. 11523 (March 12, 1992)

budget (which covers the period from 2004 through 2008). The 5-year program budgets for which the Companies seek authorization include \$24 million for HECO, \$23 million for MECO and \$16 million for HELCO. In addition, under the proposed flexibility provisions described below, each Company could commit to additional capital expenditures for CHP system installations during the initial 5-year program period of up to 25% of the Company's 5-year program budget.

The attached Exhibit A provides the Companies' current forecast of the rate at which CHP systems can be developed.² Included in the forecast is the number of CHP systems by year, and the anticipated sizes of those systems, and the total CHP systems megawatt capacity by year.

The installed capacity for a CHP system takes into account 1) the normal usable electrical output of the CHP generators (which varies with the fuel burned by the generators), 2) the electrical load reduction impact, if any, of the facilities utilizing the waste heat (generally, an absorption chiller that displaces air conditioning load), and 3) the electrical load of any auxiliary facilities (such as a cooling tower). The installed capacity numbers do not take into account the capacity component of the transmission

and Decision and Order No. 11630 (May 22, 1992) in Docket No. 6617.

² The level of CHP Program development forecast at this time is based upon the Companies' current expectations. The September 2003 East Coast blackout has generated considerable discussion and interest in the issue of distributed generation. It also appears that the U. S. military is planning a substantial increase in the number of personnel assigned to Hawaii. Any change in the economy that results in higher fuel prices or increases in other costs that put pressure on electric rates will encourage customers to seek opportunities to lower their energy costs. These factors could result in a significantly greater demand for CHP systems.

and distribution (“T&D”) line loss savings associated with on-site generation.³ This is addressed further in Sections VIII.2.d., e. of this Application.

Given the current demand for CHP systems by the Companies’ customers, the Companies have projected that HECO would install CHP systems with an effective capacity of 14.6 megawatts (“MW”) in the first 5-years of the program (i.e., 2004 through 2008), MECO⁴ would install an estimated 13.4 MW, and HELCO would install an estimated 9.9 MW.⁵

2. CHP Program Costs

The CHP Program costs include the costs of 1) purchasing and installing the CHP systems (which would be capitalized and included in rate base, as is the case with other capital expenditure projects⁶), 2) operating and maintaining the CHP systems, which primarily include the cost of fuel burned by the CHP generators and maintenance costs, and 3) administering and marketing the program, including the costs of HECO’s Energy Projects Department that are not charged to specific CHP system installations.

a. CHP Program Capital Expenditures

The Companies project that HECO will install an estimated 30 CHP systems, at a

³ These line loss savings are reflected in the quantitative economic analyses discussed in Part VIII.

⁴ For MECO, the CHP Program is limited to the island of Maui. Due to their small size utility systems, the CHP Program will not be offered for the islands of Lanai and Molokai, and potential CHP systems on these islands will be considered under special Rule 4 contracts.

⁵ See Exhibit A. These amounts include an installation for each of HECO and MECO that the Companies initially estimated could be completed in 2003. Their expectation now is that no installations will occur before 2004, even if a few individual Rule 4 contract applications are filed and approved pending approval of the CHP Program.

⁶ The Company proposal is to rate base the entire installation, and to include all revenues (including the facilities fee) as utility revenue. New location codes, property units and other necessary accounting revisions will be made to properly account for this equipment.

cost of approximately \$24 million, in the initial 5-year program period (i.e., 2004 through 2008). The 5-year estimates for MECO are 28 systems, at an estimated cost of \$23 million, and for HELCO are 18 systems, at an estimated cost of \$16 million. (See Exhibit B.)

The estimated installed cost for a typical CHP system installation, and the inflation assumption included in the 20-year estimates, are addressed in Part VII of the Application, and in the discussion of the quantitative economic analysis in Part VIII.

b. Approval of Capital Expenditures Projects

As is indicated above, the average installation is expected to cost less than \$1,000,000. The limit on any installation within the scope of proposed Schedule CHP is \$2,000,000, which would allow for a CHP system installation of up to about 1,200 kilowatts (“kW”) of effective capacity. Therefore, as is addressed in Part XII of this Application, the Companies respectfully request an exemption from the requirements of paragraph 2.3(g)(2) of G.O. 7 for capital expenditures projects involving CHP systems installed pursuant to their CHP Schedules.

c. Operating and Maintenance Costs

Operations and maintenance (“O&M”) of the CHP systems are discussed in Part VII of this Application. The primary operations cost is the cost of the fuel (diesel, propane or synthetic natural gas (“SNG”)) burned in the CHP generators. The acquisition and transportation of the fuel are discussed in Section X.3. The generating units will generally be base loaded when operating due to sizing the installations based on the

thermal requirements of the site. The current plan is for all of the CHP generating units to be remotely monitored and controlled by MECO's Power Supply Department. (See Section VII.3.a.) The estimated maintenance costs, on a levelized basis, are expected to be about 2¢/kWh (in \$ 2003). (See Section VII.4.b.)

d. Administration and Marketing Costs

The basic development and administration of the CHP Program has been assigned to the Energy Projects Department at HECO. This Department is responsible for assisting HECO, HELCO and MECO in the development of detailed CHP system proposals, the management of CHP project development and construction, and the startup of CHP systems. A majority of the costs for this work will be included in the capital costs for the individual CHP projects. The anticipated annual labor and related overheads expense level for preliminary program work and administration for the Companies by the Energy Projects Department is approximately \$250,000. Personnel assigned to the Energy Projects Department are the only staffing additions being made for the CHP Program. These support expenses are not accounted for in the economic analyses of the subject CHP Program, but the results of the analyses indicate that this level of costs can be supported by the CHP Program.

3. Program Flexibility

The Companies' proposed CHP Program has the potential to significantly expand the market for CHP systems in the State. As discussed in Section V.5 below, public interest in CHP and the demand by customers for the Companies to offer CHP services

has continued to increase. The implementation of the Companies' initial CHP systems will also help to validate the benefits of CHP systems for "wait and see" customers who may be uncomfortable about committing to what is to them a new and unproven concept.

Exhibit B provides an estimate of the number of CHP system installations, and related capital expenditures, forecasted annually over a five-year CHP program implementation schedule and a 20-year planning horizon. Customer acceptance of the benefits of CHP systems will influence the success and "ramping-up" of the CHP Program. There may be some "lumpiness" in the number of CHP systems installed in the early years of the implementation of the CHP Program until potential customers have the opportunity to see first hand the benefits of the initial CHP system installations. There is also the potential that the CHP Program may become "oversubscribed" due to higher than expected demand and/or based on expected CHP system "success stories" that are shared in the engineering, architectural and contractor communities. In order to establish and maintain an orderly implementation of the CHP Program, the Companies request that the Commission grant the Companies CHP Program flexibility. This flexibility includes:

- a. The ability for each Company individually to combine the annual forecasted CHP Program capital expenditures into a five-year "pool" of funding (i.e., the 5-year program budget) to be able to commit to CHP systems without the limitation of having to defer committing to CHP systems until the following year because the Company has "exhausted" its annual forecasted CHP Program capital expenditures. This will allow the

individual Company the opportunity to meet customer demand for CHP systems if the ramp-up of customer participation in the CHP Program is higher than forecasted.

- b. The ability for each Company individually to exceed its five-year CHP Program budget by not more than twenty-five percent. This ability would allow the individual Company to address any potential “oversubscription” if more customers want to participate in the CHP Program in the initial five-year program implementation schedule than initially forecasted.
- c. The ability to modify these provisions, with Commission approval. If customer participation in an individual Company’s CHP Program is significantly greater than initially forecasted, and the above flexibility provisions are not sufficient to meet customer demand, then the Company would request Commission approval to modify the above flexibility provisions in a letter filing, and will include in such filing the basis for its proposed modification, and the position of the Consumer Advocate with respect to such modification. The proposed modification will not be effective unless and until approved by the Commission.

4. Program Reporting

Given the level of capital expenditures for the CHP Program and the key role that the CHP Program will play in meeting the Companies’ energy and capacity requirements, the Companies’ plan to provide timely information to the Commission and the Consumer

Advocate in order that they can track the progress and effectiveness of the Companies' CHP Program. The Companies propose to file an annual status report by February 28 of each year of CHP Program implementation (after the first year) that will include the following information:⁷

- a. Description of the individual CHP systems installed during the program year, including size of the CHP system, fuel type, heat rate, system availability and run hours and outage hours, and mode of operation.
- b. Estimated versus actual individual CHP system capital costs. The estimated CHP system costs will be the amount stated in the individual CHP system notice transmittal.
- c. Estimated versus actual CHP Program capital costs for each year of program implementation. The estimated annual capital costs are included in Exhibit B. The estimated annual capital costs for the CHP Program will be updated in each Company's respective IRP cycle to reflect the latest available information on capital costs and customer participation.
- d. Estimated versus actual kW and kWh output of the individual CHP generators installed during the program year. The estimated kW and kWh output will be the amounts stated in the individual CHP system notice transmittal. The estimated annual kW and kWh output for the CHP Program will be updated in each Company's respective IRP cycle to reflect

⁷ Certain customer specific information may be deemed confidential and would be provided to the

the latest available CHP system information.

- e. Estimated versus actual thermal output of the individual CHP systems each year.

V

CHP PROGRAM JUSTIFICATION

1. Introduction

The Companies' proposed CHP Program is justified by 1) the effective furtherance of the State's energy policy objectives to reduce the consumption of imported oil due to the higher efficiency of the CHP systems, 2) the related environmental benefits associated with the reduced fuel consumption, 3) the improved electrical system efficiency, 4) enhanced customer and system reliability, 5) the expansion of options available to the State's energy consumers, and 6) the potential for CHP systems to help meet the need for additional generation. In addition, the quantitative analyses included with this Application address whether or not the Companies' ratepayers, taken as a whole, are better off or worse off if the utility provides CHP systems to qualifying customers. The results of the quantitative analyses, which are addressed in Part VIII of this Application, show that there are expected to be net positive benefits to all customers as a result of the CHP Program (and not just to customers participating in the program).

2. Qualitative Assessment of the CHP Program

The Companies' position regarding the benefits and value of CHP systems has

evolved over time as the CHP market and technology have developed.⁸ Up until recently, the cost of CHP systems was so high as to make the implementation of a broad based utility CHP program undesirable. As the cost, efficiency, and operating characteristics of CHP systems have improved, the viability of such a program has increased. At this time, there are a number of benefits to active utility participation in the CHP market through the subject CHP Program.

a. There are a number of clear customer, environmental, and economic benefits to CHP systems:

- Utility participation in the CHP market provides the utility customers with one more option to meet their energy needs – in the words of one customer, it means “one stop shopping”. Customers want to focus on what they do best and let the utility do what it does best:
 - Own, operate and maintain power facilities.
 - Manage fuel procurement for power facilities.
 - Manage the electrical system interface.
- Because of the efficiencies inherent in a CHP system versus traditional central station power units, less fuel is consumed on an equivalent per kilowatthour basis, and emissions may be lower per kilowatthour of output.

⁸ The evolution in the Companies’ approach to distributed generation DG/CHP was provided in response to Informal Complaint No. IC-03-098, Part I, Appendix A, filed August 5, 2003, a copy of which is attached as Exhibit C.

- The efficiencies of CHP systems also provide for lower costs to meet customers' needs.

b. Utility participation in the CHP market can help to create a bigger CHP market:

- It validates the benefits of CHP for those customers that are in a "wait-and-see" mode.
- Customers may have greater confidence in the technology if the utility is involved.

c. Development of the CHP market has the potential to generate enough capacity as measured in kW to help defer the need for new central station generation.

Due to the limited applicability of CHP systems, the market is not likely to be big enough to eliminate the need for new central station generation, but it can help to defer the need.

d. Although it is difficult to quantify, CHP systems strategically located may have the potential to defer the need for some transmission and distribution ("T&D") system upgrades.

e. The Companies' participation on a regulated basis should ensure that the interests of all customers are taken into consideration. Benefits should be available to the customers for whom CHP systems are a viable option, but the interests of other non-participants should be protected.⁹

⁹ The independent implementation of CHP systems results in a loss of revenue to the utility and all customers are then ultimately adversely impacted by the lack of contribution to fixed costs from the customers that implement third-party CHP.

3. Quantitative Analyses

In order to quantitatively analyze the economic impacts of the Companies' proposed CHP Programs (and to evaluate the impact on the revenue requirements of non-participating ratepayers), two different impacts of the programs must be analyzed. First, the Companies would install some CHP systems that would displace some of the CHP systems and DG units that might have been installed by non-utility vendors. The benefit of these installations (i.e., the electric revenues retained and the thermal and facilities revenues gained) and the capital and O&M costs of these installations and the O&M costs that would have been avoided by the non-utility installation must all be considered. In addition, the Companies' CHP Program would increase the total number of CHP systems installed, which should avoid certain central station generation costs (particularly if central station generation additions can be deferred). The costs and benefits of these incremental CHP system installations can be analyzed using standard avoided cost methodologies, as long as the difference in revenues from the sale of central station power and from the installation of CHP systems under Schedule CHP are taken into account. (See Part VIII.)

4. Unquantified Benefits

The CHP Program should have a number of benefits that cannot be captured and quantified in the economic analyses. These benefits include 1) the ability to add capacity incrementally, which can help address uncertainties with respect to the need for new central station generation and with respect to the permitting (and, therefore, completion)

of such facilities, 2) the need to offer CHP systems to customers when they have the opportunity to add such facilities in a manner that is most cost-effective for them, 3) the potential for T&D benefits, 4) the benefit to the Companies of spreading out CHP system projects over time, and 5) the benefits of adding energy-efficient systems in furthering State energy policy.

a. Incremental Capacity Additions

In the economic analyses, the net present value cost of adding CHP systems would appear to be lower if systems were deferred and added closer to the need dates for new central station generation. However, there are uncertainties with respect to the capacity need dates on the islands of Oahu, Maui and Hawaii, and the potential benefits of adding CHP system capacity earlier than the need dates for new central station generation in addressing this uncertainty are not captured in the economic analyses.

For example, recent load forecasts are forecasting higher load growth rates, showing an upward trend in the rates of expected growth. On Oahu, the Department of Defense is considering the relocation of an aircraft carrier task force to Pearl Harbor, which could accelerate this trend. In addition, the need dates for new central station generation are dependent on the ability of demand-side management programs (both energy-efficiency and load management) to continue to reduce the rate of load growth. Further, there is uncertainty as to the permitting schedules for new central station generation, given recent experience with respect to land use and air permitting. Finally, there is continuing uncertainty as to the status of the firm capacity provided by

independent power producers, particularly on the Big Island.

b. Customer Needs

Customers can achieve added benefits if CHP systems can be installed when they are renovating or adding to their commercial facilities, when they are planning to replace existing equipment (such as chillers), and/or when they are planning new commercial facilities.

c. Potential T&D Benefits

The Companies have not identified specific instances when installation of customer-sited CHP systems would affect the need date to replace or add T&D transformers or other facilities. Nonetheless, there are potential benefits that may materialize as CHP systems are added.

d. Spreading Out CHP Projects Over Time

The installation, operation and maintenance of customer-sited CHP systems will be a new activity for the Companies, although they will be able to rely on the extensive experience in this area of Hess Microgen LLC (“Hess”), pursuant to a Teaming Agreement between the Companies and Hess (see Section V.5 below). Thus, it will be beneficial for the Companies to gain experience by spreading out the installation of CHP systems over a 5-year period, rather than seeking to defer all of those installations to the year proceeding the expected need date for new central station generation.

e. State Energy Policy

The installation of cost-effective energy efficient CHP systems should further the

objectives of Hawaii's State energy policy.

5. Broad-based Customer Support and Demand for the CHP Program

As was informally discussed with the Commission, the Companies' initial plans, in the late 2001 through 2002 timeframe, was to do a limited number of "pilot" CHP projects, under special contracts requiring Commission approval, in order to gain hands-on experience with the reliability and costs of customer-sited CHP and/or DG systems. The term "pilot" was used simply to denote that the resulting experience might or might not indicate that a full-scale offering to customers would be warranted.

The Companies pursued several candidate pilot opportunities, each time informing the customer of the need for Commission approval prior to reaching a definitive agreement. The Companies' initial attempts to design customer-specific CHP/DG installations for individual customers were not successful – generally because the estimated project costs were too high.

At the same time, the public interest in CHP and the demand by customers for the Companies to offer CHP services continued to increase. Concurrent developments with respect to the leading installer of CHP systems in Hawaii, Hess, the ability to utilize lower cost skid-mounted packaged systems pioneered by Hess, and the Companies' increasing focus on customer choice and non-traditional ways to meet the growing demand for electricity, convinced the Companies that it would now be cost-effective to offer the subject full-scale CHP Program.

As the Companies again informed the Commission and the public, the Companies

signed a Teaming Agreement with Hess in February 2003 (which is attached as Exhibit D), and began to explore the potential demand for such a service (which would be a necessary component of a Commission application). The Companies also accelerated their efforts to develop a CHP tariff (including a standard form of contract).

Since the announcement of the Teaming Agreement between the Companies and Hess in early February 2003 and the utility roll-out of the concept it is considering, a number of customers have requested presentations from the Companies regarding the conceptual approach. Most customers want to focus on their core business and let the utility be the energy company. A key factor in the favorable response of most customers has been the fact that CHP systems are simply one of the options the utility considers in helping the customer seek optimal energy efficiency. The Companies are currently in discussion with 11 specific customers regarding potential CHP system projects that may qualify for the CHP Program.¹⁰ Customers seem to appreciate the fact that the utility is not in the equipment sales business and will, consequently, also evaluate other options such as the installation of energy conservation measures tailored to the unique needs of that customer and facility.

Customers are asking the utility to offer a full range of services related to their energy needs. Since there are many options available, the utility approach is to assist the individual customer in determining which options are best for that customer's site. In

¹⁰ The Companies also are in discussions with several customers regarding CHP systems that would be outside the scope of the proposed CHP Program. Separate approval by the Commission would be requested for any contracts entered into as a result of these discussions. (See Part IX.)

some cases, the best way to heat water may be with heat pumps – in others, a CHP system may be best. For some sites, high efficiency electric chillers make more sense than absorption chillers using waste heat from a CHP system. Since the utility is not in the equipment sales business, customers indicate that they are more confident that the utility will do a more objective job of analyzing the options and helping the customer to find the optimal energy solution for their site.

With regard to CHP systems in particular, customer support is based largely upon the utility's willingness to provide complete services. Again, hotel operators, for instance, do not want to own, operate and maintain power systems. They are satisfied that the utility brings a comprehensive package of total energy solutions and has the highest level of expertise for that kind of work. Most customers are focused almost exclusively on their bottom line. They want to reduce operating costs any way they can, and they want to do it with a minimal amount of investment and risk on their part. The majority of customers have responded very favorably to the simplicity of the approach proposed by the utilities. If they can meet the eligibility requirements for a utility CHP system, the customer needs merely to make available a viable site for the system. In return, they receive electricity and heat at prices that afford them energy cost savings, without having to invest their own capital.

In summary, there is broad-based customer support for the CHP Program. Many customers do not want to own, operate or maintain CHP systems. Some customers may be uncertain about the staying power of mainland-based vendors, but trust the utility to be

there for the long-term and to work out any problems that may occur. Most customers at least want the utility to be an option they can consider. The Companies firmly believe that it is in the public interest to promote cost-effective CHP system installations and customer choice, and that a utility CHP program will be beneficial in promoting these objectives.

VI

SCHEDULE CHP

1. Pricing

a. Price Components

The proposed Schedule CHP has three basic rate components (see Exhibit E):

- Service under Schedule CHP will be provided under the applicable Rate Schedule for commercial and industrial demand customers - Schedules J, PS, PP, or PT - or any changes thereof. For HECO, the Schedule CHP customer's monthly bill will be reduced by 1.0 cents per kWh for all kWh generated by the CHP system. For HELCO, the Schedule CHP customer's monthly bill will be reduced by 1.6 cents per kWh for all kWh generated by the CHP system. For MECO, the Schedule CHP customer's monthly bill will be reduced by 1.5 cents per kWh for all kWh generated by the CHP system.

- A facilities charge would be paid by the customer that would enable the utility to recover the cost of equipment not traditionally included in the utility rate base, if applicable to the individual CHP system.
- A thermal charge would be paid for the waste heat utilized for heating and cooling.

With these factors in mind, the pricing system for utility-owned CHP systems was developed with the following key components:

- The pricing of all electricity consumed by a given customer site based upon current PUC approved electricity tariffs.
- A fixed electricity price discount for all kilowatthours generated by the CHP system on a customer's site.
- A fixed facilities charge that enables the utility to recover costs for equipment not normally in the utility rate structure.
- A thermal charge that is based upon the specific design parameters of the project and the customer's thermal usage, but which escalates over time at a predictable rate.

The proposed utility CHP system base level pricing is presented in the following table:

| | <i>HECO</i> | <i>MECO</i> | <i>HELCO</i> |
|-----------------------------------|--------------------|--------------------|---------------------|
| CHP energy discount | 1.0 ¢/kWh | 1.5 ¢/kWh | 1.6 ¢/kWh |
| Base thermal charge ¹¹ | 40 ¢/therm | 45 ¢/therm | 50 ¢/therm |
| Estimated Customer Savings | 10% | 12-14% | 12-14% |

The actual determination of the various pricing elements used in the modeling of utility-owned CHP systems was finalized by testing the impact of variations in the various pricing elements on the resulting savings to be realized by a customer and the impact on utility customers as a whole. The price levels chosen as base levels were determined to be reasonable because they resulted in a positive impact on the total customer base and yielded savings in the range believed to be expected by utility CHP customers (as discussed in Section VI.1.e. below).

b. Electricity Pricing

All rates (subject to the CHP energy discount in Schedule CHP) and provisions in a Schedule CHP customer's otherwise applicable Rate Schedule (generally, Schedule J or Schedule PS, PP, or PT) will continue to apply. The energy cost adjustment in the

¹¹ ± 50%, as discussed in Section VI.1.d.

Energy Cost Adjustment Clause and the Integrated Resource Planning Cost Recovery surcharge will still be added to the customer's monthly bill. Other rate riders may be used in conjunction with Schedule CHP only if and to the extent they do not conflict with the terms of Schedule CHP.

In order to deal with the fact that normal utility rates vary over time based upon rate case decisions and the application of the Energy Cost Adjustment Clause, it was considered advisable to retain the current basic pricing scheme for electricity as the foundation for pricing electricity from utility owned CHP systems. If the CHP system is utility-owned and part of the utility rate base, it is appropriate to consider all electricity provided by the utility, whether from a central station or an on-site CHP system, as simply utility provided power. Ideally, all utility-owned CHP systems will be interconnected on the utility side of the customer's meter. However, in some cases, practical cost considerations will dictate that the logical point of interconnection is on the customer's side of the meter. In those cases, the output of the CHP facility can be added to the input from the grid to determine the customer's total consumption. Metering to accomplish this task is readily available. By totalizing the customer's usage, existing standard tariffs can continue to be applied.

To determine the electricity discount for the utility CHP system, a number of issues were considered. Among those issues were:

- A desire to provide the customer a meaningful discount that reflected the fact that the customer was providing a site free of charge.

- A need to recognize that there were utility system benefits resulting from the utility involvement in the CHP market such as the deferral of central station generating units and the potential deferral of T&D system upgrades or expansion.
- Recognition that the efficiency of the CHP system allows the utility to generate electricity at a cost lower than is possible with traditional central station units using the same fuel.
- Recognition that the efficiency of the CHP systems may result in environmental benefits related to the amount of fuel necessary to meet the customer's energy needs.
- Potential third-party competition for the customer.

Since a large part of the savings to be realized by a customer comes from the discount on the kWhs generated on site, the Companies have included in the CHP Agreement a minimum guaranteed annual electrical discount. The minimum is based upon a value calculated on the basis of an 85% availability of the CHP system. The minimum value is adjusted for those occasions when the CHP system units are available to deliver load and the customer cannot utilize the output for whatever reason.

c. Facilities Charge

Schedule CHP establishes a monthly 2003 base facilities charge for Schedule CHP customers with absorption chillers ranging in size from 50 tons to 500 tons. The levelized charge will escalate at the compounded rate of 3% per year, effective January 1

of each year, to account for expected inflation in the cost of the equipment. The applicable monthly charge for an individual customer will be fixed for the term of the CHP Agreement based on the base charge, escalated to the charge applicable in the year in which the agreement is executed. For example, a HECO customer executing a CHP Agreement in 2004 for a CHP system that included a 240-ton absorption chiller would pay a facilities charge of \$1,524 per month ($\$1,480/\text{month} \times 1.03$) for the 20-year term of the agreement.

The concept of a facilities charge resulted from the consideration of the basic pricing of electricity to a CHP system customer based upon existing electricity rate schedules. If one considers the concept that existing rates include the embedded cost of existing utility generation assets and that the cost of the generating component of a CHP system approximates the embedded cost of conventional central plant generation, the existing tariffs are a reasonable means to recover the cost of a CHP system. This assumes that the development rate of CHP systems does not exceed the utility's load growth and, therefore, the added CHP generating capacity is effectively meeting new load increments.

To determine the facilities charge, a given CHP system installation cost is divided between the traditional utility generation equipment and system equipment such as chillers and cooling towers that have not normally been part of utility plant and equipment. The installed cost of the non-traditional utility equipment is computed and levelized over the contract period. The facilities charge is calculated using each

Company's allowed rate of return on rate base.

There will be some projects where there will be no facilities charge because all of the heat output of the CHP system is used directly for heating or other secondary systems such as in a laundry. In these cases, there is no need for the additional equipment required when there is a cooling application.

d. Thermal Charge

Schedule CHP establishes a base thermal charge after taking into consideration a number of factors. Among those are:

- The cost of the fuel displaced by the use of waste heat from the CHP system.
- The total CHP system design and construction cost.
- The specific use of heat in the particular application.

The thermal charge is also intended to be the means to deal with project cost differences that derive from the nature of the site available for the installation. In some cases, it will be possible to serve a customer with a CHP system that is essentially 100% shop fabricated, shipped to the site and "plugged in". In other cases, it will be necessary to locate key components in an existing mechanical room located in a basement of a building. The cost of the system in these two diverse cases is different and some means needs to be available to account for some of the system-specific cost differences.

As a result, Schedule CHP provides that the base thermal charge may vary by +/- 50% depending upon the characteristics of the particular installation. If the site enables

the installation of a pre-packaged, skid-mounted CHP system, the charge can be lower and still yield an adequate return for the Company and an appropriate level of savings for the customer. If the site requires that the various components of the CHP system be field installed and interconnected, the charge will need to be higher to cover the extra cost. Ultimately, the thermal charge rate will be a negotiated value in each case, as it is not only the means to deal with project cost differences, but it is also the means to deal with competitive situations.

It should be noted that the amount of flexibility created by the ability to vary the base thermal charge will be relatively limited. The annual thermal charge for a customer with a nominal 500 kW CHP system would normally be approximately \$46,000 (\$ 2003), assuming a base thermal charge of 40 cents per therm. A variance of +/- 50% would result in a difference of about +/- \$23,000 per year. This is relatively small compared to the cost for the electricity generated by the CHP system.

The thermal charge is not fixed for the term of the Agreement, and is adjusted on June 30th of each year based on the percentage change in the Gross Domestic Product Implicit Price Deflator (“GDPIPD”), which is a generally accepted inflation measure. The percentage change in GDPIPD will be measured from a base of 110.66 for the year 2002 (1996 = 100), to the reported final value for the year in which the adjustment is made.

e. Normal Implementation of Pricing Competition

In an unregulated market, market participants are allowed to modify their

respective prices in response to the pricing strategies of other market participants.¹² In a regulated market such as the electric utility industry, the regulated electric utility is at a disadvantage relative to other unregulated market competitors, because it must satisfy Commission filing and/or approval requirements before changing its prices. An unregulated vendor that proposes to sell a customer an on-site generator does not have to satisfy Commission filing and or approval requirements. Moreover, unregulated vendors are not subject to the Commission's regulatory oversight, so the public is at risk for problems related to safety, customer service, customer protection, and other aspects of the unregulated vendor's operations.

In developing a pricing strategy for utility offered CHP systems, consideration was given to the manner in which unregulated competitors were pricing CHP services. Most competitors were offering customers a guaranteed savings of approximately 15% over their current energy costs. Current energy costs were defined as the amounts paid for electricity and fuel to produce heat. A review of those offers indicated that the calculation methodology in fact resulted in savings a bit lower than what was claimed. Actual savings were in the range of 12 to 14%.¹³

The Companies plan to offer a comparable level of savings to potential CHP

¹² In competitive markets, the assumption is that prices will be based on marginal costs. Therefore, enabling the electric utility to compete by offering prices at or above its marginal costs of providing electricity fosters economically efficient competition, and avoids uneconomic bypass of the utility's system.

¹³ In some cases, a customer may be willing to move forward with a CHP system even when the resultant savings are less than 10-15%. That is generally true in cases where the customer is making a change in its operation and needs additional heat or cooling capability and does not want to make the capital investment. In some cases, the requirement is simply the replacement of aging equipment.

customers to be competitive with unregulated CHP vendors. The planned customer savings targets under the CHP Program are 10% for HECO and 12%-14% for HELCO and MECO.

One element that is common with all customers who want to pursue a utility CHP system is that they want to be assured that under all circumstances their energy costs will be lower with the system than without it. They also want someone else to be responsible for the operation and maintenance of any generating equipment since they do not consider such tasks as part of their core business or competencies.

2. Availability/Eligibility

In order to properly focus the time and effort of the Companies' resources on CHP system opportunities that have a high probability of meeting the goals of the CHP Program, eligibility criteria have been established regarding customers who may avail themselves of the program. (See Exhibit E, Eligibility Criteria for Schedule CHP.) The intent of the eligibility criteria is to establish general guidelines for screening projects. There may be specific circumstances where one or more of the eligibility criteria may be waived because the nature of the specific CHP system is such that the project can meet the goals/objectives of the CHP Program, and the Company would provide the basis for a waiver of any of the eligibility criteria in the individual CHP system notice transmittal.

In recognition of the fact that CHP systems are mechanical systems that require maintenance and will incur forced outages, it is desirable that utility CHP systems be comprised of at least two cogeneration units. This will ensure the customer of higher

system availability. This is the basis for the minimum size requirement established in the eligibility criteria. The general practice to be followed in the design of a CHP system will be to match the CHP equipment to the base heat load of the facility to be served. Almost always, this will result in the electrical output of the CHP system being less than or equal to the base electrical load of the facility. The intent is that peaking heat requirements should be served from auxiliary boilers, peaking chilling requirements should be met with electrically driven chillers, and peaking electrical requirements should be met with power from the utility grid. In no case will Company-owned CHP systems be sized for export of power from the CHP system to the utility grid on a continuous basis.

The other eligibility criteria generally relate to the suitability of the customer's site for a CHP system installation, and the customer's authority to provide the site and to enter into a 20-year agreement.

One of the key contributions of the customer to the CHP system will be the site for the system. Criteria have been established regarding the issues of importance with respect to CHP system sites. For example, it would not make sense for a Company to accept an environmentally contaminated site. Nor does it make sense to accept a site which is located such that the permits necessary to install and operate the CHP system can not be obtained. Site accessibility is critical for installation, maintenance and operations of the CHP system.

In the early stages of the CHP Program, it is expected that the majority of the

customers will be existing operations seeking to reduce their operating costs. Those customers will have existing equipment that can be utilized to backup the CHP system and the customer will be required to maintain the existing equipment based upon the customer's need for service reliability.

Aside from the equipment related criteria noted above, the customer must have the requisite financial and legal capability to meet the obligations being taken on pursuant to Schedule CHP and the CHP Agreement.

In addition, the Company is not required to serve a customer under Schedule CHP if, in the Company's judgment, the rates would not achieve the intended purpose and would not benefit the Company's customers as a whole. The purpose includes retaining load that would otherwise be lost if the customer implemented a non-utility generation alternative, provided that the customer's contribution to the Company's fixed costs is greater than if the load was lost.

3. Contract File and Suspend

a. Standard Form Contract

Customers taking service under Schedule CHP will be required to execute a standard form Combined Heat and Power Agreement ("CHP Agreement"), setting forth the applicable rate components, the customer's total capacity and energy requirements, the termination provisions, and the other terms and conditions set forth in Schedule CHP.

The CHP Agreement will be included with each individual CHP system notice transmittal, filed with the Commission in accordance with the file and suspend provisions

of HRS Section 269-16(b), and will be kept open for public inspection (except that the thermal charge and customer information deemed to be confidential and proprietary will be deleted and filed pursuant to a Protective Order issued by the Commission). This will provide an opportunity for the Commission to review the individual CHP system notice transmittal and CHP Agreement before the CHP system is installed and the CHP Agreement becomes effective.

b. File and Suspend

The “file and suspend” provisions in Schedule CHP would operate as follows:

- Following execution of a CHP Agreement with a customer, the Company will file a forty-five day file and suspend notice transmittal with the Commission for a CHP system specifying the customer, the estimated capital costs for the CHP system, the rate components, and the effective date of the CHP Agreement, together with the CHP Agreement. The effective date of the CHP Agreement must be at least forty-five days after the filing of the forty-five day file and suspend CHP system notice transmittal. The forty-five day file and suspend CHP system notice transmittal will have attached to it a certificate of service showing service, at the time of filing, on the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs of the State of Hawaii (the “Consumer Advocate”). The forty-five day notice file and suspend CHP system notice transmittal will be

kept open for public inspection (except that the thermal charge and customer information deemed to be confidential and proprietary will be deleted and filed pursuant to a Protective Order issued by the Commission).

- The effective date of the CHP Agreement will be the first day of the month following the expiration of the notice period (of at least 45 days), unless the Commission issues an order suspending the effective date of the agreement within the notice period.
- If the Commission issues an order suspending the effective date of the CHP Agreement, the CHP Agreement will not be effective until the first day of the month following the Commission's issuance of an order allowing the CHP Agreement to take effect.
- If the Commission issues an order suspending the effective date of the CHP Agreement, and the effective date of the CHP Agreement is delayed by more than forty-five days as a result of the suspension order, then either the customer or the Company may terminate the CHP Agreement by providing written notice of such termination prior to the effective date of the CHP Agreement.
- If the Commission conditions its order allowing the CHP Agreement to take effect upon the Company and the customer agreeing to modifications to the CHP Agreement, the Company and the customer

must execute a conforming amendment to the CHP Agreement with the required modifications within forty-five days of the issuance of the order (unless such period is extended by mutual written agreement), and the CHP Agreement will not be effective until the first day of the month following execution and filing with the Commission of the conforming amendment; provided that if the customer or the Company elects not to execute such a conforming amendment within such forty-five day period, as extended, then the CHP Agreement is terminated.

The forty-five day notice feature is necessary so that customers will have reasonable assurance as to when and whether Company-owned CHP system projects will proceed. Many customers will not make a decision to move forward with a CHP project until they have some stimulus such as aging equipment that needs to be replaced or changes in their operating conditions that require additional central plant investment. At the time they decide to move forward, customers then want the utility to move at the same pace as the unregulated competition.

4. Other Terms and Conditions

a. Confidentiality

In order to determine a customer's eligibility, the customer must provide certain customer information, as specified in Terms and Conditions No. 1 of Schedule CHP. Information provided to the Company relating to the customer's business operation, and designated by the customer as being confidential, will be treated as confidential. HECO

may disclose such information to the Commission and the Consumer Advocate, subject to Commission issuance of a Protective Order. The electric rate discount provided to the customer will not be considered to be confidential. The thermal charge for the waste heat provided for heating and cooling is deemed to be confidential because its disclosure may disadvantage the Companies in their negotiations for CHP systems in the future.

b. Eligibility

As discussed above, the Company will determine a customer's eligibility under Schedule CHP in accordance with the Eligibility Criteria attached to the Schedule.

c. Term

The term of the CHP Agreement is twenty years, and continues from year-to-year thereafter.

Long-term contracts have advantages for both the customer and the Companies. It does not make sense to abandon a facility without getting the full useful life out of it. With proper maintenance and operations practices, there is no reason the CHP system cannot perform for 20 years. As utility-owned equipment, it is imperative that the equipment be maintained to utility standards and have sufficient life to have capacity value for system planning purposes. Ensuring that the proper standards are met for the long-term means that the utility needs to maintain control over a longer contract term. Furthermore, the customer is benefited by having long-term, consistent, and dependable service.

Most of the third-party suppliers of CHP systems have generally offered relatively

short-term shared savings contracts (up to 7 years). The initial utility pilot proposals were based upon similar terms to match what competitors were offering. The length of the term was geared primarily to financial performance. However, the Companies have also noted that performance of the third-party supplied systems indicated that the level of maintenance performed on the systems was geared to the short contract terms. The suppliers were setting the term to avoid major unit maintenance requirements that would need to be met for longer system life. Consequently, there are some CHP systems in Hawaii where the units have been replaced even during the shorter terms due to a lack of maintenance or proper operations. In other cases, customers have inherited systems at the end of the term that required major expenditures for major overhauls.

d. Termination

The CHP Agreement provides for termination by the Company or the customer under specified conditions and the detailed terms and conditions related to the various termination scenarios.

The customer may terminate the CHP Agreement upon the Company's material breach of the CHP Agreement, if the breach is not cured pursuant to the process in the agreement. Upon such termination, the Company will, at its expense, promptly remove the cogenerator and attached related equipment. In the event of a breach, the customer may pursue its other legal and equitable remedies.

In addition, the customer may terminate the CHP Agreement if, after installation of the CHP system, the customer demonstrates to the Company's satisfaction that the

customer's total CHP system energy costs (electric, thermal and facilities) for any 120 day period exceed the energy costs that the customer would otherwise incur for the same period for equivalent operations if the customer used its own chillers and/or purchased electricity from the Company under Company's applicable (non-CHP) tariff rate schedule. If terminated under such circumstances, then the customer must pay the Company for all construction and development costs the Company has incurred, and the customer will be offered the opportunity to purchase the CHP system components from the Company, as is, at a negotiated price approved by the Commission. Alternatively, the Company will, at the customer's sole cost, remove the CHP system. If the customer purchases the CHP system, it will enter into an interconnection agreement with the Company, if applicable. In addition, the customer must pay the Company a termination charge equal to the total value of the discount provided through the electricity discount in Schedule CHP for the six months preceding the termination date.

The Company may terminate the CHP Agreement upon the customer's failure to make payment as provided in the CHP Agreement or upon the customer's material breach of the CHP Agreement, if the breach is not cured pursuant to the process in the agreement. Upon such termination, the Company may, at the customer's sole cost, remove the cogenerator and attached related equipment, and/or may pursue its other legal and equitable remedies.

In addition, at any time during the term of the CHP Agreement, if the Company determines, in its reasonable discretion, that the economic viability of the project is

materially impaired, the Company may cease operations and terminate the CHP Agreement without cost or liability to the Company other than removal of the CHP system. In such event, if the CHP system has been installed, the Company will offer the customer the opportunity to purchase the CHP system, as is, at a negotiated price approved by the Commission. If the customer does not purchase the CHP system, the Company will be responsible, at its own cost, for removing the cogenerator and attached related equipment.

The Company may also terminate a CHP Agreement if the customer uses electricity not supplied by the Company (other than energy from a non-fossil source or from the customer's own emergency generator when operated during emergency periods, or for limited test periods, or at the Company's request) during the term of the CHP Agreement.

e. Interconnection

Since the CHP systems will be owned by the Companies, the Companies will be responsible for interconnecting the generators to their systems in accordance with the interconnection standards in their tariffs. Customer-sited CHP system installation at the site must be able to comply with interconnection standards in Rule 14H at reasonable cost. Standard CHP systems installed by the Company will not have islanding capability (i.e., the ability to automatically remain in service isolated from the grid). If the customer requests islanding of the Customer-sited CHP system, and the Company determines that islanding capability reasonably can be provided, then the customer must make a non-

refundable contribution of the incremental cost that will be incurred by the Company to provide that capability.

f. Customer's Electricity Supply

In general, the Company must be the sole supplier of the customer's total electric energy requirements during the term of the CHP Agreement. The only exceptions to this provision will be circumstances where the customer generates a portion of its electrical requirements from non-fossil sources or from its own emergency generator when operated during emergency periods, or for limited test periods, or at the Company's request.

g. Letter of Intent

Upon a customer's acceptance of a conceptual proposal for a CHP system located on that customer's site, the customer must enter into a letter of intent to continue the pursuit of the development of a CHP system. The letter of intent will provide that the customer will reimburse the Company for its engineering expenses up to a specified amount if the final design of the system achieves approximately the same level of economic benefits as the conceptual proposal and the customer decides to not move forward with the project. If the final design does not achieve the same level of benefits and the customer declines to continue with the development of the CHP system project or the Company declines to continue with the development of a CHP system project, the Company will be responsible for those engineering costs. If both parties agree to

continue with the project, the engineering costs will be included in the total CHP system project costs.

VII

CHP SYSTEMS

1. **Introduction**

CHP stands for “Combined Heat and Power”, which is an electricity generating system whose waste heat is captured and used for heating and/or cooling applications. The advantage of a CHP system over conventional electric generating units is the increased efficiency obtained when the captured waste heat is put to useful purposes. The thermal efficiency of fuel usage typically ranges from 85 to 90% for a CHP system compared to 35 to 40% for conventional central station generating units.

a. **Components of a CHP System**

Exhibit F is a mechanical single line diagram of a typical CHP system. The primary components of the system are: 1) the generating units with waste heat recovery modules, 2) an absorption chiller, 3) a heat exchanger for heating water, and 4) a cooling tower.

The generating units to be utilized by the Companies for the foreseeable future will be electric generators driven by diesel engines or small combustion turbines. The material provided in response to PUC-IR-5 filed August 5, 2003 in the Companies’ response to Informal Complaint No. IC-03-098 provides considerable detail regarding the Hess engines, as well as general information about the Hess packaged CHP systems. The

heat recovery modules are designed to recover heat from both the cooling water jacket for the engine (in the case of the diesel engine) and the exhaust of the engine. These modules are typically tube and shell type heat exchangers, where the working fluid passes through tubes that are surrounded by the hot water or exhaust gases. The recovery of heat from these two sources can occur in parallel or in series. The absorption chiller is a cooling machine that uses heat as the primary source of energy for driving a refrigeration cycle. The hot water heat exchanger can be of many types, but is conceptually the same as the tube and shell type heat exchanger noted above. In most cases, a cooling tower will be required to further cool the heat exchange fluid before it is returned to the generating unit as a cooling fluid.

b. Fuels

Wherever possible, diesel fuel will be utilized for utility CHP systems. Diesel fuel has a lower cost per British Thermal Unit (“Btu”) than alternative fuels and engine performance is better when diesel fuel is utilized. On Oahu, SNG will be used in environmentally sensitive areas provided it is available in sufficient quantities to the project site. Other locations will require the use of propane where SNG is not available and emissions are a critical factor.

c. Fuel Tanks

If diesel is the chosen fuel for the CHP system, the customer must allow the Company a shared-use of the customer’s existing fuel tank(s), if any, for the CHP system's fuel storage, at no cost to the Company. The customer must ensure that the fuel

tanks meet all regulatory requirements and standards. In such cases, the customer will continue to own its existing fuel tanks used by the Company, and the Company will operate and maintain the fuel tanks in accordance with the CHP Agreement.

Propane tanks are generally provided by the fuel supplier. No fuel tank is required if SNG is used.

If there are no existing customer-owned fuel tanks or the existing tanks are not acceptable to the Company, the Company will, at its expense, design, construct, install, own, maintain, and operate the fuel tank(s) necessary for the CHP system's fuel storage. The customer must provide a suitable and adequate site on its premises, acceptable and approved by the Company, for the installation and operation of the Company's fuel tanks, at no cost to the Company. The customer also must provide the Company with 24-hour access to the site throughout the term of the CHP Agreement.

If the customer's existing fuel tank(s) is utilized, the Companies propose to allow the customer to draw fuel from the CHP system fuel tank during CHP system outages when it is necessary to run the customer's backup equipment (such as a boiler used to produce heat) or when the backup equipment is needed for peaking service. Separate fuel meters will be provided to meter the fuel used by the Companies and the fuel used by the customer. In such cases, the customer would reimburse the utility for the cost of fuel provided by the Companies.¹⁴

¹⁴ The fuel reimbursement arrangement is addressed in the CHP Agreement included in Schedule CHP.

2. Hess Packaged Systems

The estimated cost of acquiring and installing the CHP systems to be offered under the CHP Program is based on the economies obtained by using packaged CHP systems manufactured by Hess¹⁵, and the use of Hess' experience in designing and installing customer-sited CHP systems pursuant to the Teaming Agreement between the Companies and Hess, a copy of which is included in Exhibit D to this Application.

a. Hess

Hess approached the Companies about a possible partnering arrangement as early as the spring of 2001. Initially, the Company resisted the Hess offer in favor of taking more time to evaluate the developing CHP market. In November 2002, Hess again approached the Companies for a teaming arrangement because:

- Hess preferred to sell equipment, rather than operate and maintain installed equipment.
- As a mainland-based company, Hess had some problems in addressing operating and maintenance issues. On the maintenance side, these included maintaining a dedicated, trained workforce on all islands with installations.
- Hess' national clients in the hotel, grocery, and other industries wanted Hess to install CHP systems in Hawaii. Local customer representatives

The Companies would only be reimbursed for the actual cost of the fuel provided.

¹⁵ There will be certain circumstances where facility constraints do not permit such an installation. In those cases, the system will be manufactured, integrated and tested at Hess before being disassembled

(e.g., operating engineers) wanted the utility to own, operate and maintain the CHP systems. Both Hess and the utility saw an opportunity to meet the needs of their customers.

- Hess saw an opportunity to substantially expand the market for CHP systems in Hawaii if the utility offered CHP.

Hess has some customers with a national account who have facilities in Hawaii. These customers are pressing Hess to implement CHP systems at those facilities. In particular, Starwood Properties is aggressively pursuing CHP systems. For the reasons noted above, coupled with the fact that Hawaii's high electricity costs favor the development of CHP systems, Hess approached the Companies to establish a teaming agreement. Hess believes that Hawaii represents a substantial CHP market if the Companies participate in it.

b. Packaging Concept

The Companies considered a number of vendors before deciding that the Hess equipment met the needs of most situations and was the most cost effective. A key to teaming with one vendor is management of project costs. The specific requirements in most projects can be met by a wide variety of equipment. There is generally not sufficient technical differentiation between the performance of internal combustion engines of the same size to clearly favor one vendor over another.

The differentiator in favor of Hess was the packaging concept developed by Hess,

for shipment to the customer's site.

which dramatically reduces field construction costs. The use of common equipment also provides for more uniform and consistent designs and thereby significantly reduces maintenance requirements and costs. The design approach followed by Hess for its packaged systems is significantly more cost effective than that followed by most of the competitors in the business. Hess utilizes an array of standard components and prepares a design by selecting the appropriate standard components from that array. This does not necessarily lead to the absolute highest efficiency, but it is very cost effective. The Companies found that many vendors incur additional costs attempting to refine designs that have to be field assembled and adjusted.

Hess offers skid mounted, pre-wired, pre-piped, and factory tested combined heat and power systems. This concept reduces on-site construction time and disruption as well as start-up problems. Hess performs thorough factory tests and evaluation of individual components and the total system for reliability and value.

The entire Hess system (not just components) is UL¹⁶ approved. Other vendors have not taken the time nor the effort to pursue this test program. Although focused on safety, the UL approval provides a level of quality assurance to both the utility and the customer.

c. Other Hess Capabilities

In addition, the Companies took into consideration the proven capabilities of Hess with regard to the specific tasks that are part of the development and operation of a CHP

¹⁶ Underwriters Laboratories, Inc. (UL) is an independent, not-for-profit product safety testing and

system in Hawaii, which allows the Companies to tap into that expertise when needed.

These tasks include:

- Conduct project feasibility analysis
- Refine project design/engineering
- Permitting
- Fuel supply arrangements
- Project financing
- Equipment supply/contracting
- Construction management
- O&M services

3. CHP System O&M

a. Operations

CHP Systems are designed for predominantly automatic operations once the initial checkout and system balancing are completed. The CHP system protective devices are generally set to shut down the units in the event of a problem to protect the equipment from damage. Depending upon the nature of the problem, the unit may be restarted remotely or it may be necessary for an operator to check out the CHP system before restarting. The Hess design includes extensive remote monitoring capability. The Companies intend to take advantage of that capability and monitor the units from a central location on Maui. Each of the utility dispatch centers will also have monitoring

certification organization and has tested products for public safety for more than a century.

capability to know, at a minimum, which CHP system units are on/off and the load being carried by each unit. Technicians will be dispatched to the customer sites as required. In addition to the above procedure, when requested by the customer, customer site engineers will receive training on the CHP system that is sufficient to enable them to check and restart the CHP system at the site under certain circumstances. A Company employee will direct such activity via telephone when appropriate.

b. Maintenance

Since MECO has the greatest concentration of internal combustion engines among the three Companies, MECO initially will provide CHP system O&M support services to all three Companies, to the extent possible. Local mechanical contractors will be used for the maintenance of chillers and other cooling equipment. Services provided to HECO and HELCO by MECO will be billed in accordance with standard intercompany billing procedures. As the number of CHP system installations increases for each Company, they will develop their own O&M support services capabilities. Pursuant to the Teaming Agreement between the Companies and Hess, Hess is providing training and certification on the Hess equipment for the MECO's employees responsible for the operations and maintenance of the CHP systems. Hess is also maintaining parts depots in Hawaii in support of the local installations. Stock will include spare engines.

4. CHP System Costs

a. Installed Costs

The typical, nominal 500 kW CHP system composed of two 235 kW units and a

95 tons absorption chiller installed on Oahu is expected to have an installed cost of approximately \$766,000 (\$2003).¹⁷ Roughly 45% of the total cost is for shipping and site installation cost. Site costs include permitting, electrical engineering for the grid and facility interconnection, mechanical engineering for the piping interfaces, site civil construction, electrical and piping work, project management, and start-up activities. Site specific engineering and construction work will be contracted to local engineering and construction firms. Project management will be done by HECO, and start-up activities will be supported by Hess. The balance is for the packaged, skid mounted CHP system which includes the generator set(s), absorption chiller, cooling tower, controls and switchgear. A detailed breakdown of these costs is provided in Workpaper G, to be filed under a separate transmittal. (This information is deemed confidential because it contains competitive information and will be provided to the Commission and Consumer Advocate pursuant to a Protective Order.)

b. O&M Costs

The detailed O&M work plan developed for the Hess CHP systems is provided in Workpaper G, to be filed under a separate transmittal. (This information is deemed confidential because it contains competitive information and will be provided to the Commission and Consumer Advocate pursuant to a Protective Order.) O&M costs have been calculated for the purpose of financial modeling at the rate of \$0.018/kWh for

¹⁷ This cost is stated in 2003 dollars. The installed costs of CHP systems are escalated in the economic analyses discussed in Part VIII based on the inflation rates used by the Companies for financial analyses such as avoided cost calculations.

HECO, \$0.02/kWh for HELCO, and \$0.0195/kWh for MECO.¹⁸ To account for the O&M costs for the heat exchange equipment, the same per kWh rate (i.e., \$0.018 for HECO) was multiplied by the kWhs displaced by the absorption chiller. This value was used in the cost analysis in the same way as the rate for the O&M costs for the generating unit. These costs take into account the level of maintenance required to meet the proposed 20-year contract life. The differences in costs between the Companies are primarily due to expected travel time from the utility central stations to the customer sites.

The primary maintenance activities include lube oil and oil filter changes, air filter changes, engine work to retorque the heads, the 12,000 hour top end inspection work, and the 24,000 hour bottom end inspection work. The work is done periodically based on engine run hours. Since the generating units are base loaded, the labor and material costs for these periodic maintenance functions can be estimated on a cents per kWh basis for economic analysis purposes.

VIII

CHP PROGRAM ECONOMIC ANALYSES

1. **Introduction**

If one of the Companies loses sales due to a DG vendor's CHP system or DG project, the Company loses revenue based on the reduction in demand charges (due to the

¹⁸ These costs are stated in 2003 dollars, and are escalated in the economic analyses discussed in Part VIII based on the inflation rates used by the Companies for financial analyses such as avoided cost calculations.

reduction in monthly peak demand, if any), and the reduction in energy charges, and saves the variable operating and maintenance costs associated with that part of the customer's reduction in load and energy. Since the energy charge recovers a substantial percentage of the Company's fixed demand and customer costs, the lost revenues far exceed the saved costs. All else being equal, other customers (non-participating ratepayers) have to pick up the difference.

If the Company installs a utility CHP system instead, it retains the demand and energy charge revenues from the sale of electricity (less the reduction, if any, in energy usage and demand due to the use of waste heat to displace electricity, and less the price reduction to reflect the benefits of customer-sited generation); it gains revenues from the sale of waste heat (therms) and from the facilities charge for the absorption chiller (if an absorption chiller is included in the project); and it incurs the capital, operating and maintenance costs for the CHP system installation.

All of these revenue and cost impacts were considered in the quantitative economic analysis of the CHP Program for each Company. Thus, discounts in the electricity price, the therm price, and the facilities fee, were explicitly considered. Similarly, the revenues that a Company continues to receive from a customer for supplemental or backup service provided under its regular rate schedules if a DG vendor does the project also are explicitly considered.¹⁹

¹⁹ In effect, HECO and MECO's CHP system projects have to compete against the revenue retaining aspects of their regular rate structures. HELCO currently has the benefit of a Standby Service Rider—Rider A, which is applicable to customer-sited, non-utility CHP system projects. As is indicated in

When the Companies actively pursue their respective CHP Program, they fully expect the rate of CHP system installations to be accelerated. The Companies would not simply be displacing CHP system and/or DG installations that might have been installed by a non-utility vendor, such as Hess or others, but will be adding to the number of CHP system installations. The costs of “incremental” CHP system projects have to be compared against costs avoided by the Companies (through capacity addition deferrals²⁰, if any, and through non-generation by and non-transmission of the energy from central station generation.)

In the case of the CHP Program, both effects are expected to be present and were analyzed in the quantitative economic analysis of each Company’s program.

2. Planning Assumptions and Forecasts

The planning assumptions and forecasts used to evaluate the CHP Program are described below:

a. A 20-year planning period was used for the CHP Program. This follows the 20-year term used in the IRP process.

Section XI.5, there is a question as to whether the rider will continue to be mandatory once HELCO’s CHP Program is approved, and HELCO intends to discuss this issue with the Consumer Advocate. At this point, HELCO has not attempted to analyze the extent to which its revenues for displaced non-utility CHP systems would be greater if Rider A is continued (than those that it would receive under its regular rate schedules). This is a somewhat complex analysis, because the incremental impact of Rider A depends on whether customers comply with the rider and install the required meter for the CHP generating unit, and which of the options available under the rider are elected by customers. The incremental impact should be relatively small if customers comply with the rider, and would not substantially impact the positive results of the economic analysis for HELCO.

²⁰ To the extent that Company CHP system projects displace non-utility CHP system projects of equivalent size, in total, the Company has conservatively assumed that non-utility CHP system projects will have the same central-station capacity deferral “value” or capacity “duplication” cost

b. Forecasts were developed of the expected CHP market penetration with and without utility participation for this 20-year term (see Exhibit A). A critical issue in the development of the CHP forecast was the timing of CHP system additions. The CHP forecast is based upon 1) a limited survey of the interest of many of the Companies larger customers, 2) the rate at which CHP systems have previously been developed, and 3) the Companies' expectations of the stimulus to the CHP market that will result from utility participation in the market. To some extent the pace of CHP system additions is limited by the available resources as well as the regulatory process inherent in a utility CHP program.

c. In order to deal with the total impact of both third-party and utility CHP systems, the generating capacity of the CHP systems was considered and the electric load displaced by the use of absorption chillers was also considered.

d. In order to analyze the impact of the CHP Program, consideration had to be given to the constraints inherent in the modeling tools and the practical implications of the assumptions used for the process. Rather than attempt to develop conceptual designs for every known potential CHP customer and "guesstimates" for non-specific potential customers, it was decided that a generic CHP system building block would be identified for modeling purposes. To develop that generic CHP system building block, the Companies first considered the specific customers they believed were highly likely to embrace CHP systems. The Companies divided those customers into

(until new generation is needed) as Company CHP system projects.

three size groups and then developed a rough conceptual design for each group. In that process, the Companies found that a standard generic CHP system “building block” could be utilized to meet the requirements of a broad array of potential customers. The design and pricing of the generic building block was then refined for each of the three utility companies. To properly establish the pricing and performance parameters for the CHP system building block, a weighted average of the initial three conceptual packages was utilized. That is, the Companies considered the number of identified customers in each group and “weighted” the price and performance parameters appropriately to define the generic CHP system building block. The final work product of this process was a Unit Information Form (“UIF”) for a generic building block CHP system for each of the three Companies that included all of the basic input data required for inclusion of utility owned CHP systems in a typical generation planning analysis (see Exhibit G).

e. The UIF prepared for a generic utility CHP system included the following information:

- i. Configuration and components: The typical (or average) CHP system installation had the following components and configuration:
 - Two CHP units for reliability: Two units will allow an outage on one CHP unit while allowing continued partial waste heat recovery output.
 - A single absorption chiller and cooling tower is expected for most CHP system installations since most customers will have air conditioning chilled water requirements.

- The CHP systems will also be sized to provide baseload heat requirements for domestic hot water or laundry applications.
 - The CHP system control system would be designed to follow the customer's thermal requirements. The CHP system would be throttled as the thermal load decreases to minimize the need to dump excess waste heat.
- ii. Capital cost: The equipment cost for the generic CHP system was based on equipment cost quotes from Hess for a diesel-fueled CHP system. Engineering, permitting, project management and construction costs were estimated for a skid system which minimizes on-site construction requirements.
- iii. Fuel selection, cost, and delivery fees: The Companies generally plan to use diesel fuel largely due to the lower cost of diesel fuel compared with propane. Diesel fuel costs for HECO, MECO and HELCO were based on HECO's July 2002 Fuel Price Forecast. The cost to deliver fuel to individual customer sites using a tanker truck with on-board transfer pump was estimated at 3 cents per gallon for HECO and 5 cents per gallon for HELCO and MECO. Propane fuel HD-5 grade or SNG would be used in CHP system installations where 1) air permit restrictions create unfavorable restrictions with the use of diesel fuel, 2) siting of a diesel fuel tank is impractical, 3) diesel fuel exhaust fumes would be a potential problem, and

- 4) other site specific conditions which preclude the use of diesel fuel.
- iv. Unit efficiency: The generic CHP system heat rate is an average of the various size diesel-fueled units offered by Hess.
 - v. Availability: The utility CHP system availability of 91% is based on an expected 8,000 hours of operation per year on the CHP system.
 - vi. O&M costs: A detailed O&M costs estimate was prepared for HECO, MECO, and HELCO. Separate estimates were prepared to account for expected cost differences between the Companies.
 - vii. CHP System Load Profile: The normal control scheme for the utility CHP systems will be to minimize the need to dump excess waste heat.
- Preliminary discussions with potential CHP customers indicate a general reduced need for power, heating and cooling in the off-peak hours. The load profile used as an average dispatch for the utility CHP systems in the generation cost modeling provided for a 20% load reduction from 9:00PM through 6:00AM.
- viii. Operating dispatch: The utility CHP systems will generally be continuously operated to meet the customer's electrical and thermal needs. There will be exceptions where some units may be shut down nightly or on weekends.

3. Results

The cost-effectiveness analyses of the CHP Programs, based on the Utility Cost

Test perspective over a 20-year planning horizon, resulted in a positive net present value benefit of \$2,262,000 for HECO, \$5,749,000 for HELCO with Keahole ST-7 (\$6,206,000 without Keahole ST-7) and \$9,390,000 for MECO. These results indicate the CHP Program is expected to be cost-effective from a Utility Cost Test perspective. (See Exhibit H.)²¹

4. Methodology

The cost-effectiveness analyses of the CHP Programs were conducted on a Utility Cost Test basis and compared the costs of the CHP Programs against the benefits of the proposed programs. The benefits of the CHP Program are comprised of the deferral value of future central station generation, and the displacement of central station generated energy by meeting new load and energy requirements with CHP systems, as well as in sales derived from the CHP Program displacing some third-party CHP projects, which would have resulted in lost sales to the utility. (See Exhibit H.) Reduced capital and fixed O&M expenditures derived from the deferral of future central station generating unit additions are components of the avoided capacity costs. Energy produced by the CHP systems installed under the CHP Program, which resulted in a reduction of fuel, variable O&M and independent power producer (“IPP”) energy costs for existing and future central station generation resources, are components of the avoided energy costs.

²¹ As stated in Section IV.2.d., these results do not account for certain expenses expected to be incurred by HECO’s Energy Projects Department to support each Company’s CHP Program. The results would still be positive, however, if these expenses were accounted for in the analyses. At the same time, the

In determining avoided costs, consideration was given to the impacts of third-party CHP projects. A forecast was made of the amount of third-party CHP projects that would likely be implemented if the CHP Program were not implemented. A second forecast was made of the amount of third-party CHP projects in a scenario in which the CHP Program was implemented. Where the change in third-party CHP projects was forecasted to decrease (i.e., there were less third-party CHP projects forecasted in the case in which the CHP Program was implemented), the difference in third-party CHP projects forecasted as a result of the CHP Program reduced a portion of the CHP Program's avoided capacity and avoided energy. This reduction of benefits was factored into the avoided capacity and avoided energy calculations.

Calculations of avoided capacity and avoided energy were performed using the differential revenue requirements methodology - the same methodology used to determine avoided costs for the Companies' DSM programs. The differential revenue requirements methodology calculates a "base case" scenario in which future central station generation unit addition timings were determined using a base assumption for future sales and peak reduced by an amount of third-party CHP projects estimated in a scenario in which the CHP Program is not implemented.²² A second "alternate case"

analyses cannot account for certain unquantified benefits that are expected to be obtained as a result of the programs, as discussed in Section V.4.

²² HELCO's resource plans generally assume that the next generating unit after CT-5 is the installation of ST-7 at Keahole. However, it is recognized that HELCO has faced many delays in completing the installation of CT-4 and CT-5, and it is possible that ST-7 could encounter similar obstacles. As a result, HELCO has examined the possibility that ST-7 is not installed, leaving CT-4 and CT-5 to be operated as stand-alone, simple-cycle units at Keahole. Under this "No ST-7" scenario, efforts are made to develop an unspecified West Hawaii site for eventual dual-train, combined-cycle operation.

scenario is created in which future central station generating unit addition timings were determined using the same base assumption for future sales and peaks, but reduced by an amount of third-party CHP projects and utility CHP projects estimated from a scenario in which the CHP Program is implemented. The differential revenue requirements methodology compared the change in revenue requirements for capital costs, fixed O&M costs, variable O&M costs, fuel costs, and IPP energy payments. Any net decrease in revenue requirements is considered to be a positive avoided cost.

As already noted, in order to facilitate the modeling, a generic CHP system was defined that was a composite of the different size CHP systems that were expected to be installed to meet market requirements. The benefit of capturing the waste heat for useful purposes was captured in the analysis by using a reduced unit operating heat rate.

Fuel costs for this analysis were determined by using the Companies' July 2002 Fuel Price Forecast for diesel (No. 2) fuel and adding a delivery transportation cost adder.

In computing avoided costs, it was assumed that the CHP Program would not impact the Companies' energy efficiency or load management DSM programs (i.e., the "base case" and "alternate case" contained identical energy efficiency and load management DSM assumptions).

Once avoided costs and CHP Program costs were determined, the next step was to analyze the impact of incremental revenues from the CHP Program. Revenue streams for the CHP Program included:

The first unit to be installed following CT-5 at Keahole under the "No ST-7" scenario would be a

- The incremental electricity revenues from the sale of power generated by the CHP system. These revenues took into consideration: 1) the Schedule CHP discount of \$0.01 for HECO, \$0.016 for HELCO and \$0.015 for MECO for all kWh generated by the CHP system, 2) the extent to which electricity revenues from the CHP Program represented the “recapture” of revenues that may have been lost if the customer had done the CHP system on its own or through a third party, and 3) the extent to which a utility CHP system installation resulted in a loss of electric revenues as a result of producing chilled water with an absorption chiller rather than an electrically driven chiller.
- The incremental revenues from the facilities charge to recover the cost of equipment not traditionally included in the utility rate base (e.g., absorption chillers), if applicable to the individual CHP system.
- The incremental revenues from the thermal charge for the waste heat provide for heating and/or cooling.

IX

OTHER CHP SYSTEM PROJECTS

1. The Companies can offer CHP systems to utility customers as a regulated utility service in two ways, each of which requires PUC approval: 1) The Companies can offer such a service under a CHP tariff schedule approved by the Commission, which is

simple-cycle combustion turbine at this West Hawaii site.

the option the Companies are pursuing in the subject CHP Program, and/or 2) They can contract with specific customers under special service contracts (termed Rule 4 CHP contracts), and obtain specific Commission approval for each such contract.

2. Pending approval of Schedule CHP, the Companies plan to request approval for individual CHP projects to be installed pursuant to special service contracts under Rule 4 of the Companies' tariffs. These contracts would contain the same basic terms and conditions as those in the CHP Agreement included in Schedule CHP. By offering CHP systems as a regulated service, the Companies will ensure that the impacts of the CHP Program (and CHP Agreements entered into before approval of the Schedule CHP tariff) on all utility customers are taken into account.

3. Recent discussions with customers indicate that there is a considerable interest in CHP systems related to new development wherein the customers are asking the Companies to install the complete central plant for new facilities. The basic CHP Program is designed to serve installations wherein the customer has or will purchase its own central plant backup equipment. There are some projects where it will make sense for the Companies to provide the customer's entire central plant to ensure optimization of the energy systems, but those projects are outside the scope of the CHP Program. A prime example of this is a planned Outrigger Beach Walk project in Waikiki. The Companies also would file separate contracts for approval under Rule 4 for these projects that are outside the scope of the CHP Program.

4. In addition, to qualify for the CHP Program, the capital cost of a project

must be at or below \$2,000,000. Any CHP system project larger than this will be submitted to the Commission as a special case pursuant to Rule 4.

X

ENERGY COST ADJUSTMENT CLAUSE, AVOIDED ENERGY COST RATES

AND SCHEDULE Q

1. **ECAC Modification**

The Companies request Commission approval to include the fuel and transportation costs, and related revenue taxes, incurred under the CHP Agreements, filed pursuant to the CHP Program and Schedule CHP, in each Company's respective Energy Cost Adjustment Clause ("ECAC") to the extent that the costs are not recovered in each Company's base rates. The Companies propose to modify their respective ECAC by adding a CHP Energy Component separate from the Generation Component of the ECAC, but included in the Total Generation Factor. (See Exhibit I, which provides the modified ECAC and a blacklined version highlighting the changes to the current effective ECAC.)

The proposed CHP systems will be utility-owned and operated, and the fuel and transportation cost for CHP energy is therefore properly included as utility-owned generation in the modified ECAC. CHP units, however, are generally more efficient than other Company-owned generating units and would tend to improve system efficiency and lower the system heat rate. The Generation Component in the ECAC includes an Efficiency Factor that is fixed during rate case proceedings and limits the pass through of

fuel oil expenses to ratepayers through the ECAC. Expenses that are incurred by the utility because its fuel efficiency is worse than the fixed efficiency level cannot be passed to the ratepayer and must be borne by the utility. However, if the utility is more efficient than the fixed efficiency level it gets to keep the savings associated with the higher efficiency. Including CHP fuel costs (and therefore a possibly lower system heat rate) in the Generation Component of the ECAC would take undue advantage of the Efficiency Factor for Company generation, which was established in each Company's most recent rate proceeding and which did not include the more efficient CHP units.

Therefore, the Companies propose that a CHP Energy Component be added to the ECAC. CHP fuel and transportation costs would be recovered through the modified ECAC at actual expense levels and would not be subject to the Efficiency Factor. To the extent that CHP unit heat rates are better than the Efficiency Factor, the level of recovery would be less than if CHP fuel costs were subject to the Efficiency Factor. The Generation Factor and CHP Factor are summed to derive the Total Generation Factor. In the modified ECAC, the CHP energy cost is included on a cents per kWh basis. This treatment insures that only actual CHP costs will be passed through the ECAC, and is similar to the manner in which purchased energy costs are recovered.

By way of an example, HECO's current ECAC, approved by the Commission in Decision & Order No. 14412, Docket No. 7766, includes a Company Base Generation Component that does not include CHP since CHP was not included as generation in the 1995 test year. The proposed CHP Energy Component in the modified ECAC therefore

does not include the application of a base CHP cost. This methodology is appropriate because the percentage input to system kWh mix for Base Generation and Base Purchased Energy Composite Costs sum to 100% and fully account for the costs embedded in the base rates.

Two examples (see Workpaper I, to be filed under a separate transmittal) were prepared to demonstrate that the proposed modification to the ECAC does not alter the basic function of the ECAC mechanism approved by the Commission in Docket No. 7766. The examples assume that the CHP units are using diesel fuel. Use of other fuels, including propane or synthetic natural gas, would render the same results given that the CHP energy costs are included in the ECAC on a cents per kWh-generated basis. Both examples assume 1995 test year (Docket No. 7766) fuel and purchased energy expense levels as the reference case.

The first example (Example A), assumes energy from 10 MW of CHP capacity is added to the test year revenues and expenses. The second example (Example B) is a hypothetical illustration of an extreme case in which CHP systems completely replace both generation and purchased energy. This is not an actual or anticipated situation, but is intended to demonstrate that the modified ECAC is robust enough to operate properly under unusual circumstances. In both examples, the modified ECAC recovers only the actual level of expenses (plus revenue taxes) with no additional revenue (within the limits imposed by rounding).

These two examples show that the proposed modification to the ECAC does not

include any additional rate recovery beyond the cost of fuel consumed by HECO-owned CHP units.

2. Filed Avoided Energy Cost Rates and Schedule Q Modification

The Companies' quarterly filed avoided energy cost rates (and Schedule Q rates for Qualifying Facilities < 100 kW) incorporate a factor equal to their composite fuel costs (which is applied to certain proxy heat rates). Composite fuel costs have included the fuel and transportation costs for all Company-owned generation. The Companies propose to modify each Company's respective filed avoided energy costs filing and Schedule Q to incorporate the CHP Energy Component into the calculation of their filed avoided energy cost rates and Schedule Q payment rate. The modification identifies the composite cost of Generation and CHP as the appropriate basis for the payment rate calculation. (See Exhibit J, which provides the modified Schedule Q and a blacklined version highlighting the changes to the currently effective Schedule Q.)

3. CHP Fuel Contracts

It is expected that diesel fuel for the CHP systems would be purchased under the existing approved diesel fuel contracts for the Companies' central stations and that the fuel will be trucked from the nearest central station to the CHP system site. The diesel fuel may be purchased pursuant to existing contracts, which the Commission has previously approved, and transported via regulated motor carriers. Alternatively, the diesel fuel may be purchased on a delivered basis pursuant to a new master contract with a diesel fuel supplier. Any new fuel contracts that have not previously been approved by

the Commission will be submitted to the Commission for review and approval.

If SNG is used as the fuel, it will be purchased in accordance with the current published and approved tariffs of The Gas Company, and no further approval will be requested. SNG is only available in limited areas on Oahu.

In anticipation of the need to utilize propane as the fuel for some projects, the Companies are currently negotiating master agreements for the supply of propane on each island. Those master agreements will be submitted to the Commission for review and approval as soon as they are available. Those master agreements are expected to include all of the basic terms and conditions for the supply of propane such that specific project agreements will only need to define the specific site parameters and the pricing for the specific project. The project specific fuel agreements entered into pursuant to the master agreements will be submitted to the Commission at the same time the 45-day notice transmittal is filed for the project specific CHP Agreement.

XI

IMPACT ON COMPETITION

1. Introduction

The Companies' proposed CHP Programs will provide substantial benefits to utility customers and the State of Hawaii, without restricting the right or ability of non-utility vendors of DG units and CHP systems to offer their products and services to such customers.

As was discussed in the Companies' response in Informal Complaint No. IC-03-

098, filed August 5, 2003, there are distinct differences in the proposed offerings of the Companies and non-utility vendors, and customers should be allowed to choose between such offerings. Non-utility vendors have more than enough access to customer information to compete with the Companies' CHP Programs, and utility installations of CHP systems will meet the same Commission-approved interconnection standards that are applied to non-utility installations. The CHP Program can and should create a larger market for CHP systems. In addition to offering customers a choice that they have said they want, such a program will "validate" the benefits of CHP for "wait-and-see" customers who may be uncomfortable about committing to what is to them a new and unproven concept. Competitors will have the opportunity to offer their products and services in that expanded market.

2. Differences in Offerings

Based upon discussions with customers, non-utility vendors typically offer the following key elements:

- Electrical capacity (in some cases) that is equal to the customer's peak requirements
- A direct equipment sale or operating lease of relatively short term (usually 7 years)
- Shared savings based upon historical consumption of energy
- Equipment maintenance

The proposed utility offering includes the following key elements:

- Electrical and heat capacity based upon the customer's continuous base heat load
- Utility owned, operated and maintained system for a 20 year term
- Defined savings based upon a discount from the customers' standard tariff for power generated on site

There is a distinct difference in the proposed offerings of the Companies and of non-utility vendors, and customers should be allowed to choose as they can in any competitive marketplace:

- The Company is not participating in the market for customer-owned CHP or DG.
- The Company will be exclusively offering CHP services. Non-utility vendors can offer both CHP and DG. CHP/DG customers have the option to own and operate their own facilities, as the petroleum refineries on Oahu currently do.
- For smaller installations, the Company is exclusively offering package installations. Non-utility vendors are free to participate as competitors and offer their design/build approach. The problem with that approach is that it may not be economic for customers.

For larger installations, where even the Company must offer a design/build installation, non-utility vendors will be free to participate as competitors or by offering services to the utility.

The utility offering is limited to customers who meet certain established standard criteria to help ensure that the CHP Program provides benefits not only for the customer at whose site the system is installed, but to all customers.

As noted elsewhere, whenever possible, the utility CHP system will be a skid mounted package from Hess. The offerings of other non-utility vendors appear to be based upon individually engineered systems that are field assembled and integrated. There is a definite difference in system cost between these two options.

One key facet of the utility approach is the focus on optimal efficiency of the CHP systems by serving only the base heat load requirements of the customers. Customers have understood and accepted this approach. Non-utility vendors may offer CHP systems in concert with additional distributed generation encouraging customers to become totally self-sufficient and to disconnect from the utility grid. This approach requires a high capital investment for the customer, leaves the customer without utility backup, and is generally detrimental to the balance of the customer base.

Even with these differences, non-utility vendors will still be free to offer whatever services they can provide to customers. The utility will sell energy to its customers on the basis of regulated rates, and non-utility vendors will be free to compete against the utility rate structure.

3. Access to Information

Non-utility vendors have more than enough access to customer information:

- Customer heat use, not customer electricity use, drives the market for

CHP systems.

- Equipment suppliers have had no problem approaching customers in target industries for information regarding their heat use (or their electricity use).
- Hess is the leading player in the market, and was able to obtain sufficient information to enter into several CHP contracts in Hawaii.
- Non-utility vendors generally are affiliated or partnered with large national entities such as Johnson Controls, Inc. and Noresco, Inc., which may have access to customers through their national organizations, and Hess took full advantage of this source of information.
- The Company has strong customer relationships that have been earned by providing reliable service and being responsive to customer needs.

This is certainly not an “unfair” advantage.

Hess was clearly successful in the Hawaii CHP market as an independent third-party supplier of CHP systems. Its approach to targeting customers was based upon a solid general knowledge of the types of customers who would be potential candidates for CHP systems. There is extensive general industry data publicly available on the energy profiles of various businesses. Hess recognized that large hotels, hospitals, and food processing facilities were logical candidates and focused on those segments of the market.

The electric utility has gross electrical consumption data on its customers, but

generally has no more information unless it has previously worked with a customer. In order to design a CHP system, the customer's heat use must be known. Every utility customer has more information available than the utility and is free to make its own decision whether or not to share that information with any potential CHP supplier.

4. Standardized Interconnection Tariff, Standards and Review Process

The Companies have a standardized interconnection tariff, standards and review process, in the form of Tariff Rule 14.H, which has been reviewed and approved (as revised) by the PUC. The Companies' CHP system installations will meet the same standards, and be subject to the same review and study process, as non-utility CHP system installations.²³

5. Standby Service

One of the "concerns" identified by the Complainants in Informal Complaint No. IC-03-098 was with the Standby Charge provision (Rider A, Standby Service) on the Big Island, which they claimed would make "HELCO-owned and maintained CHP . . . far more economical to the customer than third-party-owned or customer-owned on-site generation."²⁴

In response, the Companies pointed out that Complainants' "concerns" regarding the Standby Service rider were overstated. The Rider A provision on Hawaii was stipulated to by the Consumer Advocate, and approved by the Commission, after

²³ The utilities make every effort to review site-specific interconnection requirements in a timely manner; however, each site specific requirement does require individual review.

²⁴ July 1, 2003 Letter to the Commission from the Vice-President for Pacific Machinery, Inc., the Branch

extensive review and revision in Docket No. 99-0207.²⁵ If DG/CHP customers install the DG/CHP meter required by the rider, and take advantage of the options offered by the rider, they may well be able to obtain backup service at lower cost than under HELCO's regular rate schedules.²⁶

A standby service provision was proposed on the Big Island because of HELCO's concern that application of its existing rate schedules to customers with on-site generation would not cover the cost of providing backup service to such customers. The goal in designing Rider A was to set fair and equitable rates that reasonably recovered the costs of providing standby service from standby customers imposing such costs. The following principles were applied in designing Rider A:

1. The standby service rates should be fair to the customer while reflecting the unique characteristics of the utility system, the costs of providing the service, the requirements placed on the utility system by the standby service customer, and the impacts on other customers.
2. Standby service rates should send proper price signals, such that economically efficient decisions on the part of self-generators to secure standby service result. Standby service rates should not encourage uneconomic bypass²⁷ or

Manager for Johnson Controls, Inc., and the Manager-Construction for Noresco, Inc., Appendix, p. 10.

²⁵ The Standby Service rider was approved and allowed to take effect by Decision and Order No. 18575 (filed June 1, 2001), in Docket No. 99-0207. The Standby Service rider went into effect on June 5, 2001.

²⁶ As is indicated in HELCO's Rider A Standby Charge Report filed August 7, 2002, and in the report filed on August 25, 2003, customers receiving standby service have not installed the meter socket required by Rider A.

²⁷ "Uneconomic bypass" occurs when the cost of a customer's alternative source of electrical energy is

encourage inefficient use of standby service to the detriment of other customers.

In their informal complaint, Complainants suggested that HELCO simply “repeal” Rider A. As indicated in its Rider A – Standby Service Report filed August 25, 2003, HELCO considered that option, but believes that Rider A should continue to apply to non-utility DG/CHP installations unless it is determined that that would be unfair after HELCO enters the CHP business on a regulated basis. Thus, in this proceeding, HELCO requests either (1) a finding that continued application of the standby service rider is fair in light of its proposed CHP pricing, or in the alternative (2) a determination that application of the standby service rider to non-utility DG/CHP installations should be made voluntary.²⁸ In the meantime, HELCO plans to consult with the Consumer

lower than the cost of receiving service under HELCO’s applicable standard rate schedule, but higher than HELCO’s marginal cost of providing service. Due to the manner in which rates have been established in Hawaii, HELCO’s rates for its large commercial customers are not only higher than HELCO’s marginal costs, but also are higher than its average embedded costs of providing service to such customers.

²⁸ If Rider A is modified to make it voluntary, current Rider A customers (as well as customers that have DG/CHP systems installed in the future) will have the opportunity to sign up for the Rider A option. If they do not elect to sign up for the Rider A option, they will not be subject to any Rider A charges, and will receive all service under the appropriate regular rate schedule.

At the present time, the rider applies “when a customer regularly obtains power service from a source(s) other than the Company, and obtains supplemental service from the Company when its non-utility power source(s) capability is less than its total power requirements; and/or requires standby service from the Company.” (Rider A, Terms and Conditions #1.) It does not apply when “a customer’s non-utility power source(s) is used exclusively for emergency service in case of failure of the normal supply of power service from the Company, or to a customer that has an Agreement with the Company which provides for the sale of electric energy and/or capacity to the Company that was approved by the Commission prior to October 25, 1999, or to a customer whose non-utility power is produced from a non-fossil energy source.” (Rider A, Terms and Conditions #2.)

Rider A also provided that the “connection and operation of the customer’s non-utility power source(s) in parallel with the Company’s system will be permitted when the customer is served under this Rider, and in accordance with the terms of a contract with the Company for parallel operation.” (Rider A, Terms and Conditions #3.) The requirement for an interconnection agreement in order to connect and operate a non-utility power source in parallel with HELCO’s system is now governed by

Advocate as to its views on the continued fairness of the standby service rider, since HELCO and the Consumer Advocate stipulated to the form of the standby service rider approved by the Commission.

If the Commission determines that Rider A should be made voluntary in order to alleviate concerns that Rider A will impede the efforts of competing suppliers of DG/CHP systems, then HELCO will file a revision to Rider A (using the 30-day notice provisions of HRS Section 269-16(b)) as soon as a determination has been made that HELCO will be permitted to provide CHP services to customers.

XII

AUTHORIZATION

1. Authorization to establish Schedule CHP – Customer-Sited Utility-Owned Cogeneration Service, and to modify each Companies' ECAC and Schedule Q, is sought under the provisions of Sections 269-12(b) and 269-16(b), Hawaii Revised Statutes ("HRS"), and Rule 6-61-111 of the Commission's Rules of Practice and Procedure, Title 6, Chapter 61, Hawaii Administrative Rules ("HAR"). A copy of each Company's proposed Schedule CHP is attached as Exhibit E.

2. Commission approval to include the fuel and transportation costs, and related revenue taxes, incurred under the CHP Agreements, filed pursuant to the CHP Program and Schedule CHP, in each Company's respective ECAC, to the extent that the costs are not recovered in each Company's base rates, is sought pursuant to Rule 6-60-6

of the Commission's Rules Establishing Standards for Electric and Gas Service in the State of Hawaii.

3. The Companies respectfully request an exemption from the requirements of paragraph 2.3(g)(2) of G.O. 7 for CHP system capital expenditures projects done pursuant to their respective Schedule CHP. The exemption request is made pursuant to paragraph 1.2(b) of G.O. 7, which provides that:

“If unreasonable hardship to a utility or to a customer results from the application of any rule herein prescribed, application may be made to the Commission for the modification of the rule or for temporary or permanent exemption from its requirements.”

Paragraph 2.3(g)(2) provides, in relevant part, that:

“Proposed capital expenditures for any single project related to plant replacement, expansion or modernization, in excess of \$500,000 or 10 percent of the total plant in service, whichever is less, shall be submitted for review at least 60 days prior to the commencement of construction or commitment for expenditure, whichever is earlier.”

If the requested exemption is approved, a separate application for approval to commit funds in excess of \$500,000 will not be required for CHP system projects estimated to cost less than \$2,000,000 done pursuant to the approved Schedule CHP.²⁹ The Commission, however, could still suspend the effectiveness of a CHP Agreement filed pursuant to Schedule CHP if the Consumer Advocate or Commission had questions about or wanted to review the cost of a specific CHP system project.

4. Paragraph III.D.5 of the Commission's Framework for Integrated Resource

²⁹ This request is consistent with the application filed by the Companies in Docket No. 03-0257 on September 12, 2003.

Planning (“IRP Framework”)³⁰ states, in relevant part, that: “The integrated resource plan and program implementation schedule approved by the commission shall govern all utility expenditures for capital projects, purchased power, and demand-side management programs.” As the Commission explained, “expenditures for all capital projects should be made consistent with the integrated resource plan. . . . In essence, an integrated resource plan is intended to ‘control, direct, or strongly influence’ all capital expenditures.” (D&O 11630 at 8.) The Companies’ proposed CHP Programs are consistent with the Companies’ IRP Plans, and the energy efficiency objectives of those plans. The economic analyses reflect avoided costs taking into consideration the filed IRP Plans, as adjusted for current circumstances. Also, filings in the IRP dockets explicitly recognize the evolving approach to DG in general and CHP systems in particular. Moreover, IRP Plans filed in each Company’s third IRP cycle will explicitly incorporate the Company’s CHP Program. (See Exhibit K for further information.)

³⁰ An electric utility’s integrated resource plan (“IRP Plan”) and program implementation schedule (“Action Plans”) are developed and filed pursuant to the IRP Framework (revised May 22, 1992), which was adopted by the Hawaii Public Utilities Commission (the “Commission”) by Decision and Order No. 11630 (May 22, 1992) (“D&O 11680”) in Docket No. 6617, amending and reissuing the IRP Framework adopted in Decision and Order No. 11523 (March 12, 1992).

XIII

FINANCIAL INFORMATION

Each Company's latest available balance sheet and income statement for the twelve months ending August 31, 2003, were filed with the Commission on September 26, 2003, and are incorporated by reference pursuant to Rule 6-61-76 of the Commission's Rules of Practice and Procedure, Title 6, Chapter 61, HAR.

XIV

SUMMARY

Wherefore, the Companies respectfully request that the Commission:

1. Approve each Company's CHP (Combined Heat and Power) Program and initial 5-year program budget, subject to the flexibility provisions described in Section IV.3 of this Application;
2. Approve each Company's proposed Schedule CHP, Customer-Sited Utility-Owned Cogeneration Service, and the proposed standard Combined Heat and Power Agreement and Eligibility Criteria, included therein;
3. Approve the inclusion of the fuel and transportation costs, and related revenue taxes, incurred under the CHP Agreements, filed pursuant to the CHP Program and Schedule CHP, in each Company's respective Energy Cost Adjustment Clause to the extent that the costs are not recovered in each Company's base rates;
4. Approve a modification to each Company's respective Energy Cost Adjustment Clause, avoided energy cost filing, and Schedule Q to allow the inclusion of

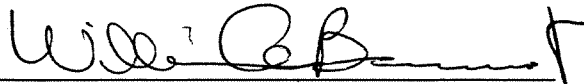
the fuel and transportation costs, and related revenue taxes, incurred under the CHP Agreements pursuant to the CHP Program and Schedule CHP;

5. Approve an exemption from the requirements of paragraph 2.3(g)(2) of G.O. 7 for CHP system capital expenditures projects done pursuant to the Companies Schedule CHP; and

6. Grant HECO, HELCO and MECO such other and further relief as may be just and equitable in the premises.

DATED: Honolulu, Hawaii, October 10, 2003.

HAWAIIAN ELECTRIC COMPANY, INC.
HAWAII ELECTRIC LIGHT COMPANY, INC.
MAUI ELECTRIC COMPANY, LIMITED

By 

William A. Bonnet
Vice President

STATE OF HAWAII)
)
) SS.
CITY AND COUNTY OF HONOLULU)

William A. Bonnet, being first duly sworn, on oath, deposes and says: That he is a Vice President of Hawaiian Electric Company, Inc., Hawaii Electric Light Company, Inc., and Maui Electric Company, Limited, Applicants in the above proceeding; that he makes this verification for and on behalf of said Applicants and is authorized so to do; that he has read the foregoing Application, knows the contents thereof, and that the same are true of his own knowledge except as to matters stated on information or belief, and that as to those matters he believes them to be true.

William A. Bonnet
William A. Bonnet

Subscribed and sworn to before me
this 10th day of October, 2003

Carolyn C. Kuwana
Notary Public, First Circuit
State of Hawaii

My commission expires: October 4, 2006

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